HEALTH
UNIVERSITY OF UTAH

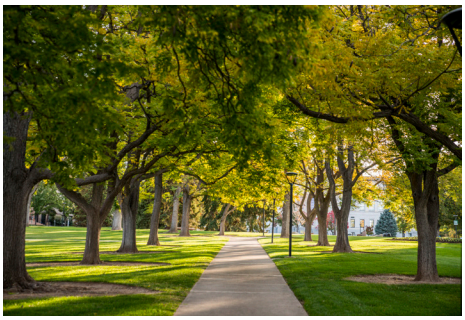
# Department of Biomedical Informatics

## 2020 Highlights

## LETTER FROM THE INTERIM CHAIR

As my service to the Department of Biomedical informatics comes to a close, I would like to reflect on all that we achieved together (and at home). We continued to strive for excellence in our research, our teaching, our learning and our service. The following pages detail what we have achieved.

We made the decision to close the doors to the department and work remotely – to protect the vulnerable patients who must use the clinics in our building. While it was hard not to be with each other every day, we have found ways to communicate and collaborate virtually. We continued to organize and attend conferences. We wrote proposals and papers. We taught countless classes online – learning new teaching modalities on the fly. We held virtual coffee breaks weekly to maintain our connections. We formed tight groups with our trainees to help support learning. It has not been easy, but BMI has continued to be a force to be reckoned with.



The School of Medicine began a chair search over the summer, and by the fall we had met with four candidates. The candidates all had ties to Utah – for example most were mentored by DBMI graduates. We will be welcoming Dr. Yves Lussier to be our chair in February. This is an exciting time for the department. Yves brings with him a lot of technical ability, experience and energy. I look forward to working with him and I am excited to see where his leadership will take us.

**Karen Eilbeck, PhD**

I have learned so much in my role as interim chair over the last 20 months. I have enjoyed working with all of you and seeing you all grow. I want to thank our administrative staff for holding up so well to the changes. We could not function without you and every one of you gives your best every day. I also want to thank the Executive Committee for taking some of the weight – there are a lot of decisions and your thoughtful discussions have helped move us forward.

As many of you know I am an optimist and I want you to know that I am looking forward to us working together in person again in 2021.

Sincerely,
--K

# Welcome to Yves Lussier, MD, FACMI

Yves Lussier, MD, FACMI, has been named Chair of Biomedical Informatics at University of Utah School of Medicine. The appointment, effective February 1, 2021, was announced by Michael L. Good, Senior Vice President for Health Sciences and CEO of U of U Health.

A professor at University of Arizona Health Sciences Center, Lussier also serves as Associate Vice President for Health Sciences and Chief Knowledge Officer. He is currently Director for the Center for Biomedical Informatics and Biostatistics and Associate Director for Informatics at the university's Bio5 Institute.

"We are standing in the lobby of the fourth industrial revolution with the convergence of digital, biological, and physical innovations," Lussier said. "Machine learning and nanotechnologies impacting medicine provide a glimpse of the coming progress. We have a unique opportunity to set a vision for the Department of Biomedical Informatics that leverages the expertise of the entire School of Medicine and catalyzes innovation and education opportunities in pioneering, emerging clinical subspecialties."

Lussier considers the faculty at U of U Health to be pioneers in translational informatics: "We want to augment the translational pipeline in the learning health system for growth and impact in health care."

As chair, Lussier will recruit and retain faculty while leading faculty development and mentorship across the department. He will promote diversity through actively promoting the recruitment of faculty and staff of minority ethnicities and ancestries. He will promote faculty participation in leadership development, grantsmanship, and performance improvement across the field, applying it to the university's clinical, research, education, and community engagement missions. "In a participative and inclusive way, I am eager to work with faculty, staff, and students to influence and multiply their strategic initiatives and ensuing achievements," Lussier says. "Paradigm-shifting opportunities abound."

**Yves Lussier, MD, FACMI**
**Incoming DBMI Chair**

Early in his tenure in academic medicine, Lussier credits research by University of Utah DBMI scientists and clinicians for shaping and inspiring his career and those of many others. "This is one of the top informatics departments in the world," he says. "For me, it's a unique opportunity to serve with the best in the field." Throughout his career, Lussier says he has been fortunate to work with colleagues who have Utah ties: "I think of them as collaborative, hard-working, smart people."

Lussier was born in Montreal and, except for a few years in Philadelphia, was raised and educated in Canada. He received a Bachelor of Applied Science and his MD degree at University of Sherbrooke in Quebec. Prior to joining the faculty at University of Arizona, Lussier was a professor at University of Sherbrooke, Columbia University, The University of Chicago, and University of Illinois. From 1990–1994, he was Vice President of Research at Development Purkinje Inc., a private health care technology company he co-founded. Lussier was one of ten American scientists invited to the White House in 2016 for the Precision Medicine Initiative Summit and is a Fellow of the American College of Medical Informatics.

# The Passing of Reed M. Gardner

It is with great sadness that we report the passing of Dr. Reed M. Gardner, a noted national leader in the field of biomedical informatics and Emeritus Professor and previous Chair of the Department of Biomedical Informatics (DBMI) at University of Utah.

Dr. Gardner had deep ties to University of Utah and our state. He earned two degrees from the U, a Bachelor of Science in electrical engineering in 1960, and a PhD in Biophysics and Bioengineering in 1968. His primary academic and research interests were broad and groundbreaking, including hospital informatics systems, computerized medical decision-making, computerization of critical care, automation of clinical processes, medical informatics education, and public health informatics. He went on to be one of the principal developers and evaluators of the medical expert system known as HELP (Health Evaluation through Logical Processing) and served as co-director of medical computing at LDS, Cottonwood, and Alta View Hospitals in Salt Lake City.

We were all fortunate to learn from Dr. Gardner, who was a sought-after visiting professor at leading academic medical centers across the county, and a frequent presenter and panel expert at many national meetings. Dr. Lussier, professor at University of Arizona Health Sciences Center and incoming chair of our DBMI, credits Dr. Gardner and other DBMI scientists and clinicians for shaping and inspiring his career and those of many others. He notes that Dr. Gardner influenced and helped to build the nation's EHR interoperability policies. He was known for his substantial expertise, enthusiasm, and communication skills.

In 2005, the annual U of U Health's Reed M. Gardner Award for Faculty Excellence was established to acknowledge the contributions of faculty members to the DBMI and Nursing Informatics. The award was created by students to acknowledge the achievements of faculty members in the areas of teaching, mentoring, and service to the departments. This award will continue to stand as a testament to Dr. Gardner's dedication and contributions to University of Utah Health.

Dr. Gardner will be sorely missed. His legacy in helping to expand the impact of the nation's first department of biomedical informatics and innovate in the field will continue to live on. We will build on and advance his legacy here at University of Utah Health to improve the delivery of health care for all.

# Equity, Diversity, and Inclusion

The University of Utah is deeply committed to enhancing the success of diverse faculty, students, and staff, as part of their broader goal to enrich the educational experiences and success of all members of the university community. The Department of Biomedical Informatics is also working actively to create a diverse and inclusive environment for trainees, staff, and faculty.

Below is a summary of the activities the department has implemented:

- All search committee members are required to take bias training before the commencement of the activity
- Annual Microaggression training for all trainees, staff, and faculty (initiated Spring 2020)
- Development of departmental diversity plan (initiated Fall 2019)
- Presence at SACNAS annual meeting for the recruitment of diverse student body
- Student developed diversity seminar series starting Fall 2020
- Commitment to recruiting diverse speakers at all DBMI events - Grand Rounds, Business Seminar, IABtalks
- Promote resources for trainees, staff, and faculty on assistance with sensitive issues, and conflicts.

# DBMI ALUMNI AWARDS

Each year our alumni vote on a graduate who has made an exceptional impact in the areas we value in our department: relevance, relationships, and leadership.

**Adi V. Gundlapalli, MD, PhD, MS, '06**

Dr. Gundlapalli, a physician and informatician, is the Chief Public Health Informatics Officer of the Center for Surveillance, Epidemiology, and Laboratory Services. In this role, he leads an interdisciplinary team to meet the evolving data and information needs of public health, thereby enhancing informatics capability. His office aims to innovate and streamline routine and emerging public health action through collaboration and partnerships across CDC, other federal agencies, and external stakeholders.

Currently he leads the Data, Analytics, and Modeling Task Force of the CDC COVID-19 Response. He works alongside CDC and US Government colleagues to provide access to data and advanced analytics to support the national response to the pandemic.

We recognize the important service that he provides for the nation in his new assignment at CDC. Congratulations Adi!

# RESEARCH

Our research portfolio covers a broad range of domains and applications including clinical decision support (CDS), population health management, natural language processing, bioinformatics, and translational research informatics. In 2020, we had very important achievements in securing new grant funding from large center grants in collaboration with investigators throughout the University and the Utah community.

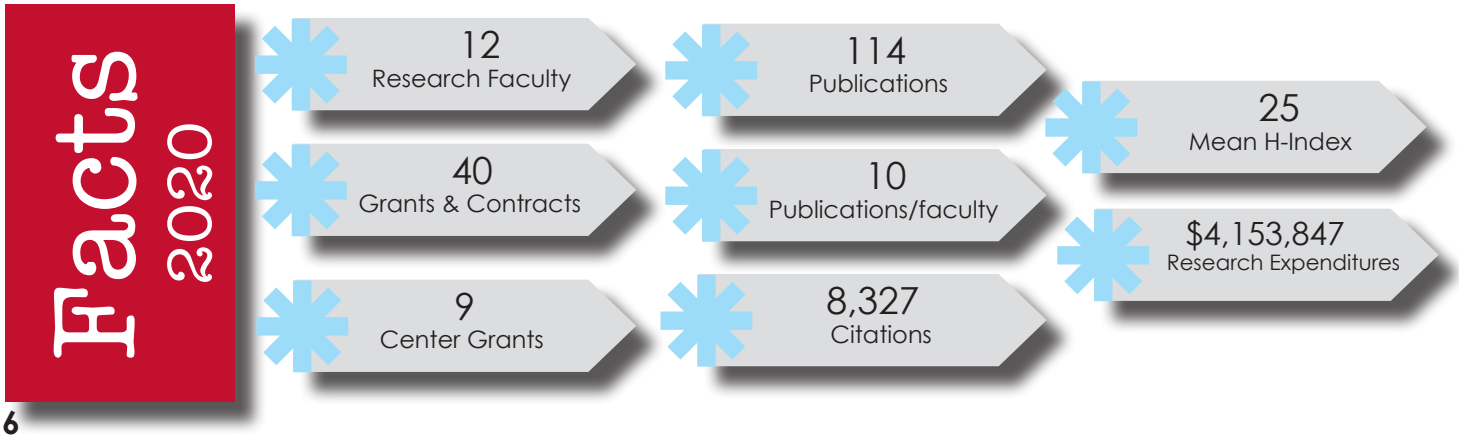
**Guilherme Del Fiol, MD, PhD**
**Vice-Chair, Research**

**NEW GRANTS**

- NCATS – *SCALE-UP Utah* (Rachel Hess, David Wetter, Del Fiol, MPIs; Gibson, Kawamoto, Reese, co-Is). In collaboration with the University CCTS, the Huntsman Center for HOPE, the Utah Department of Health and the Association for Utah Community Health, the project aims to increase the uptake of COVID-19 testing among underserved communities across Utah using EHR and text-messaging interventions.
- CDC – *Colorectal Cancer Screening Community Program* (Del Fiol, PI; Gibson, Reese, co-I). In collaboration with the Huntsman Center for HOPE, the Utah Department of Health and the Association for Utah Community Health, the project aims to increase the uptake of colorectal cancer screening among underserved communities across Utah using multi-level interventions including provider reminders in the EHR, patient reminders via text-messaging, and provider feedback through quality reports.
- CDC- *Diabetes Prevention Program* (Gibson, PI) The aim of this trial is to test the real-world efficacy of Mobile 360° Videos and a motivational coaching approach known as Motivation and Problem Solving (MAPS) as scalable interventions to increase enrollment in the DPP. If effective, they have tremendous potential to be scaled up to help prevent diabetes nationwide. Data on DPP enrollment and 4-week engagement are the key outcomes of the study. In addition, data on the mechanisms of action, cost-effectiveness and scalability of the interventions will be collected.
- NIGMS - *Timely Response to In-Hospital Deterioration Through Design of Actionable Augmented Intelligence* (Melanie Wright, PI; Del Fiol, site PI; Abdelrahman, Reese, Kawamoto, co-Is). In collaboration with Idaho State and Duke University, the project aims to investigate human-centered artificial intelligence (AI) approaches to reduce harm from late response to sepsis and acute kidney injury, and generate design principles to ensure that AI solutions can be used effectively by clinicians to improve patient care.
- NCCIH – Nonpharmacologic Pain Management in FQHC Primary Care Clinics (Julie Fritz, PI; Gibson, Del Fiol, Reese, co-Is). In collaboration with the Huntsman Center for HOPE and the Association for Utah Community Health, the goal of this project to identify effective strategies for providing nonpharmacologic alternatives to opioid pain management for patients with back pain in low income and rural communities using telehealth solutions.
- *NIH - Promoting Real World Implementation of an Evidence-Based Weight Management Intervention in*

*Primary Care* (Molly Conroy, Kawamoto, MPIs; Weir, Reese, co-I). This project will implement an innovative, EHR-facilitated weight loss maintenance intervention (MAINTAIN PRIME) using existing clinical resources and evaluated for its real-world impact. MAINTAIN PRIME will be conducted in 14 primary care practices affiliated with the University of Utah and will capitalize on advances in health IT and team-based care models to deliver the intervention with minimal support from research staff.

- *NIMH-R01 – Prediction of suicide death using EHR and polygenic risk scores* (PI: Jyotishman Pathak (Cornell), Hilary Coon Site-PI, Abdelrahman Co-I). Use machine learning methods to develop risk models of suicide death vs. suicide attempt in two large, population-ascertained samples. Data resources will include comprehensive electronic health records, demographics, familial risks, autopsy records, and polygenic risks.
- *NRF, Korea - Machine learning-based approaches to functionally annotate genetic variants in Alzheimer's disease* (Younghee Lee, PI). This project will implement a machine learning method that predict an mRNA expression with genetic variant information. It will also contribute to annotate a function of unknown genetic variants.
- ITP, Korea – Incheon 200G project: Build of a life-log based personal health data (Younghee Lee, PI). In the collaboration with the Eone Diagnomics Genome Center and Inha University hospital, Korea, University of Utah Asia campus Department of Biomedical Informatics will build an integrative dataset of personal health records comprising genetic data, lifelog data, and annual health checkup data from 200 healthy individuals. This data will be a valuable resource for predicting genetic and non-genetic factor affecting a health and identifying a personal risk factor for a health.
- *American Medical Association (AMA), Accelerating Change in Medical Education Innovation Grant* (Sara Lamb, PI; Damian Borbolla, co-PI; Karen Eilbeck, co-I). In this proposal we aim to create a partnership between expert educators in the domains of health system science, therapeutic gaming, and students utilizing a systems- thinking framework to develop a gamification-style Health System Science (HSS) curriculum.
- *University of Utah 1U4U Innovation Funding* (Jim Agutter, PI; Damian Borbolla and Bruce Bray co-PIs). Design thinking as a process for Healthcare Innovation. Engaging cross-disciplinary collaboration through design and development. The aim of the project is to develop a cross-discipline health design training program for students who are interested in digital health applications.
- Gordon and Betty Moore Foundation (Barbara Jones, PI; Weir, co-I). Development of a machine learning tool to provide feedback to physicians on diagnostic accuracy in the ED for pneumonia.
- VA HSR&D IIR – *Continuous Wearable*



*Monitoring Analytic to Improve Outcomes in Heart Failure – Link-HF2 Multicenter Implementation Study* (Josef Stehlik, PI; Weir, Co-I). The study evaluates the implementation of a wearable telemetry device that collects and physiological data and uses a predictive algorithm to alert providers. The goal is to avert hospitalizations through early intervention.

**CURRENT GRANTS**

- AHRQ U18 – *EHR-integrated lung cancer shared decision making* (Kawamoto, PI; Weir, Del Fiol, Reese, co-Is). In collaboration with Population Health Sciences (Angie Fagerlin) and University of Michigan (Tanner Caverly), the project aims to investigate the effect of a SMART on FHIR app on shared decision making for lung cancer screening. The app is being deployed within Epic® at UHealth community clinics.
- AHRQ U18 – *EHR-integrated shared decision making to reduce harm from drug interactions* (Dan Malone, PI; Del Fiol, Reese, Kawamoto, and Weir, co-Is). In collaboration with the College of Pharmacy (Dan Malone) and University of Pittsburg (Richard Boyce, co-I), the project aims to design and evaluate a shared-decision making app for potential drug-drug interactions using emerging health IT standards such as SMART on FHIR, CDS Hooks, and Clinical Quality Language (CQL).
- NIDA R03 (Michael Conway, PI) *Investigating the documentation of E-Cigarette use in the VA EHR*. Focused on the use of Natural Language Processing to extract mentions of electronic cigarette use from the Veterans Association Electronic Health Record.
- NIA R03 (Younghee Lee, PI) *Integration Analysis of Alternative Splicing in Alzheimer's Disease*. The focus is targeting alternative splicing by integrating multi-omics and AD-related endophenotype data to identify new therapeutic targets and diagnostics
- Huntsman Cancer Institute Seed grant (Younghee Lee, PI) *Develop a splicing decision model to identify functionally actionable cancer-specific somatic and rare germline variants.*
- PCORI *QuitSmart Utah* in collaboration with the Huntsman Cancer Institute (David Wetter, PI; Del Fiol, Gibson, Reese, and Kawamoto, co-Is). Through a randomized controlled trial, the study is assessing the effect of CDS interventions for tobacco cessation in federally qualified health centers that provide care for underserved communities throughout Utah.
- U24 NCI (Guilherme Del Fiol and Ken Kawamoto, co-PIs) focused on population-based CDS to identify patients who meet guideline-based criteria for genetic evaluation of breast and colorectal cancer risk based on family history documentation in the EHR. Collaborators include DBMI (Charlene Weir), Huntsman Cancer Institute (Josh Schiffman, Wendy Kohlmann), Internal Medicine (Rachel Hess, Michael Flynn), and Intermountain (Scott Narus).
- U01 NCI in collaboration with the Huntsman Cancer Institute (Kim Kaphingst & Saundra Buys, co-PIs; Ken Kawamoto and Guilherme Del Fiol, co-Is). In a multi-site randomized controlled trial (University of Utah and NYU), the study is investigating a novel approach using interactive chatbot technology to outreach patients who meet guideline-based criteria for genetic evaluation of breast and colorectal cancer. The study leverages infrastructure enabled by the NCI U24 grant above led by PIs Del Fiol and Kawamoto.
- HITECH center grant with Pediatrics (Chuck Norlin and Guilherme Del Fiol, co-PIs; Borbolla, Kawamoto and Weir, co-Is) aimed at developing tools and resources for care coordination of children with special healthcare needs. The project includes collaborators from DBMI (Damian

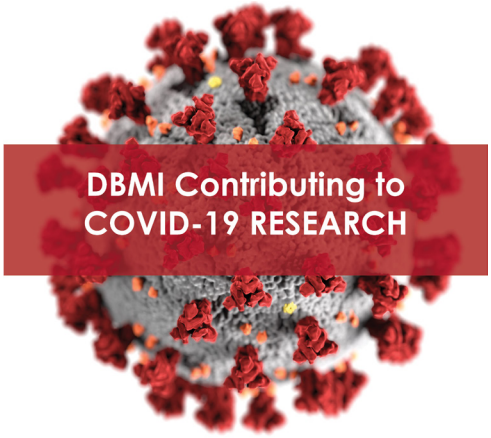
Borbolla, Charlene Weir, Ken Kawamoto), Intermountain (Scott Narus, Sid Thornton), Utah Health Information Network (Matt Hoffmann), and Medicaid.

- University of Utah CCTS (Julio Facelli, Bernie LaSalle and Ram Gouripeddi, co-Is). A large focus of the Department in the last 10 years has been on providing informatics support to clinical translational research and conducting research on translational informatics. We play a central role in all four arms of the CCTS.
- NIBIB center grant (Julio Facelli and Kathy Sward, co-PIs) aimed at enabling a standard-based, open access architecture that integrates sensor and clinical data to support longitudinal studies on asthma symptoms, treatment, and outcomes. The PRISMS Informatics Center is in its third year of funding and this year will demonstrate end-to-end capabilities using both advanced and commercial sensors.
- NIDA R21 (Michael Conway, PI) focused on using social media and natural language processing to map user trajectories between marijuana, tobacco, and electronic cigarettes.
- NHGRI center grant awarded to UNC Chapel Hill, Geisinger, ACMG, Kaiser Permanente, and the University of Utah (Jonathan Berg, PI; Karen Eilbeck, sub PI). ClinGen aims to build an authoritative resource that defines the clinical relevance of genes and variants for use in precision medicine and research. The DBMI sub award focuses on providing tools and curation to integrate clinical and genomic knowledge for the ClinGen Resource with EHR systems.
- NCATS center grant with Northwestern (Justin Starren, PI; Julio Facelli, site PI) and eight other CTSA sites to enable software tools that will allow all CTSA sites to integrate patient-reported outcomes tools into their EHRs using the SMART on FHIR standard.
- NCATS center grant with Vanderbilt (Paul Harris, PI; Bernie LaSalle, site PI; Julio Facelli and Guilherme Del Fiol, co-Is) to develop a Recruitment Innovation Center (RIC) focused on methods and resources to improve clinical trial education, recruitment, and enrollment.
- University of Utah Seed grant (Groat/Facelli, Gouripeddi, PIs) Driving out Diabetes Initiative: Diabetes & Metabolism Research Center at the University of Utah, the England Family Foundation, the Ardene Bullard "Of Love" Tennis Tournament, Jacobsen Construction: to detect and characterize impaired awareness of hypoglycemia using machine learning and non-invasive sensors in type 1 diabetes.
- University of Utah BMI Founder's Fund (Groat PI, Gouripeddi/Facelli Mentors): Development and evaluation of machine learning methods to characterize impaired awareness of hypoglycemia.
- Juvenile Diabetes Research Foundation (JDRF) and Tidepool Early Stage Investigator award (Groat/Gouripeddi/Facelli): Development and evaluation of machine learning methods to characterize impaired awareness of hypoglycemia.
- HITACHI (Kawamoto, PI) Clinical Decision Support System (CDSS) to Optimize Disease Management. The objective of this project is to (i) finalize development of an EHR-integrated diabetes management dashboard that leverages standards-based interoperability frameworks including OpenCDS and SMART on FHIR and to (ii) conduct a clinic-randomized controlled trial to evaluate the system's impact on patient care.
- R01 NHGRI (Eilbeck, PI) Community Driven Framework for Genome Based Clinical Diagnostics. This grant provides novel algorithms to define sequence variants and by developing file formats and software to communicate this information, using guidance from the clinical diagnostic community.

**Research,** continued

- T32 NIDDK (Eilbeck, Fisher, PIs) Interdisciplinary Training Program in Computational Approaches in Diabetes and Metabolism Research. The focus is to provide students with funding for stipend, travel, insurance and training related expenditures to further their training programs.
- T15 NLM (Eilbeck, PI) Biomedical Informatics Training Grant. The focus is to provide students with funding for stipend, travel, insurance and training related expenditures to further their training programs.
- T15 Supplement (Eilbeck, PI) Biomedical Informatics Training Grant Supplement.
- T15 SPUR Supplement (Eilbeck, Facelli, PIs). Biomedical Informatics Training Grant Supplement –SPUR.
- ECHO Supplement (Facelli, site PI) Utah Center for Clinical and Translational Science UL1 Supplement. National Institute Center for Advancing Translational Science.
- Seattle Children's Hospital Sub (Thorell, Gouripeddi, Site PIs) Prevention of Cerebrospinal Fluid Shunt Infections. Funded by NIH/NINDS.
- Helping End Addition Longterm (HEAL) initiative Pain Management Effectiveness Research Network (HEAL-ERN), supplement to the Trial Innovation Network (Dean PI); informatics focus is data harmonization across HEAL initiatives NIH-wide. (Informatics team is Sward co-I; Gouripeddi, Guo, Staes collaborators).
- Dartmouth Subcontract (Gouripeddi, PI) Information Extraction from EHR to Predict Readmission Following Acute Myocardial Infarction. The focus of this project is to combine clinical notes with structured data to quantify the risk for readmission.
- R43 subcontract (Weir, site PI) Less is More: Context-Relevant Views of EHRs. Funding by NIH/ELIMU Therapeutics. The focus is to develop technology to create context-relevant views of EHRs for hospitalists.
- R01 eMAR (Weir, Site PI) Improving Patient Safety and Clinical Cogntive Support through eMAR Redesign. Funding by NIH/AHRQ
- IOI – Interoperability Consulting (Facelli, PI; Rubin, Key Personnel) Provide consulting services to expand impact, advance synthetic data and persona development, accelerate R&D, formulate research pipeline, and establish workforce development services.

## DBMI Contributing to COVID-19 RESEARCH



During these challenging times in dealing with the massive fallout of the COVID-19 pandemic, our faculty are staying busy by contributing to the University of Utah's research goal to create a brighter future for all of us. See what some of our faculty are doing:

1. The translational research group has started several projects to address the COVID-19 pandemic. One of the projects, funded by the University of Utah Special Emphasis: Emerging COVID-19/SARS-CoV-2 Research seed grant program, leverages our previous work with the SpatioTemporal Human Activity Model (STHAM), which models significant and acute variations in exposure over small spatiotemporal scales. STHAM simulates activity and location trajectories on a per-person basis over geographical areas using empirical data sources such as the American Time Use Survey and US Census data. We used

STHAM to predict particulate matter exposure allowing the development of stochastic models of exposure patterns and records for groups of individuals exhibiting similar activity behaviors. We propose to extend this work to model COVID-19 exposure, spread, and mitigation. **Julio Facelli** and **Ram Gouripeddi** are collaborating with **Kathy Sward (Nursing)**, John Horel (Atmospheric Sciences), and Christopher Cambron (Social Work) in this project. In another project, funded by the Utah Center for Clinical and Translational Science, we will use 3D Protein Structure prediction to characterize the structural variation of ACE2 receptors in the general population and relate these variations to racial and geographic variation of COVID-19 infection presentation. In this work, we are collaborating with researchers at the University of Buenos Aires. In addition, our work has expanded to the following:

*Received an NCATS supplement award of $100 K to participate in the National COVID Cohort Collaborative (N3C).

*Initiated a work group to understand environmental effects on C19 within the N3C.

*We are also working on understanding the effects of C19 on diabetes using machine learning methods.

2. **Reimagine EHR**
**Ken Kawamoto** and his colleagues including Phillip Warner and David Shields are working with MDCalc, which is used by >1.75 million medical professionals every month in 200+ countries and territories, to disseminate an EHR-integrated COVID-19 Toolkit for free. This tool is already available on the App Store for the Epic EHR system, which is the most widely used EHR system in the U.S. and in use by University of Utah Health.

**Guilherme Del Fiol** and NLM postdoc fellow **Peter Taber** are collaborating with **Catherine Staes (Nursing)**, as well as Roberto Rocha and Saverio Maviglia (Harvard University / Semedy) in the analysis of COVID-19 guidance disseminated to various stakeholders through international, Federal, State, County, and institutional channels. The goal is to inform the design of information retrieval tools to help disseminate healthcare and community guidance in the advent of infectious disease outbreaks.

3. The widespread adoption of social distancing during the COVID-19 pandemic is unprecedented in recent US history, with the potential long-term psychological consequences for individuals and society not well understood. With this work, **Mike Conway** will use social media (Reddit) as a resource for investigating psychosocial stressors associated with COVI-19 social distancing, with a view to reliably identifying major causes of psychological distress and ascertaining how to mitigate them.

4. The National Institutes of Health (NIH) awarded $5 million to Rachel Hess, MD, **Guilherme Del Fiol, MD, PhD**, and David Wetter, PhD of HCI and U of U Health. The team leads SCALE-UP Utah, an initiative that aims to increase the acceptance, reach, uptake, and long-term sustainability of COVID-19 screening and testing. The initiative will be carried out in partnership with 12 community health center systems across the state than run 39 primary care clinics serving more than 115,000 patients--most of whome live in rural and underserved communities.

5. In June **Jianlin Shi, Brian Bucher, Catherine Staes, and John Hurdle** submitted an R21 COVID-19 NLP grant to the NLM in response to a special call for proposals. They just received the scores from the study section. The score was good, but the funding line is not yet known. The project involves a partnership with the College of Nursing, SL County Health Department, the Utah Department of Heatlh, and the Data Science Service at the University Hospital. The goal is to speed up case reporting by finding as many reporting items (like travel history or occupation) directly from patient clinical notes. This will save precious time for chart abstractors."

### 6. *Published Results of our faculty's work:*

**Wang Y, Li B, Gouripeddi R, Facelli JC.** Human activity pattern implications for modeling SARS-CoV-2 transmission. Comput Methods Programs Biomed. 2020 Dec 8;199:105896. doi: 10.1016/j.cmpb.2020.105896. Epub ahead of print. PMID: 33326924; PMCID: PMC7722504.

Computer Methods and Programs in Biomedicine (in press).

Exploring Environmental Risk Factors for COVID-19 Mortality and Case Rates in Type 2 Diabetes Using Machine Learning, Climatological, Meteorological and Environmental factors in the COVID-19 pandemic (online event); 4-6 August 2020. (https://public.wmo.int/en/events/meetings/covid-19-symposium)

Modeling Environment Factors in Local COVID-19 Emergent Phenomenon, R. **Gouripeddi, Y. Wang, B. Li,K. Sward, K.** Davis, C. Cambron, J. Horel, **J. Facelli**, Climatological, Meteorological and Environmental factors in the COVID-19 Pandemic, August 4 - 6, 2020

Lessons Learned from Healthcare Organizations Contributing Clinical Data to the National COVID Cohort Collaborative (N3C), S. Meystre, **R. Gouripeddi**, J. Harper, J. Talbert, AMIA 2021 Virtual Summit.

Characterizing the Effects of Air Pollution Exposure and Diabetes Prevalence on COVID19 Case-fatality Rates, N. Riches, A. Payan-Medina, **R Gouripeddi**, W. Dere, **J. Facelli**, ISEE Young 2021, 18 -19 February 2021, Basel, Switzerland

### 7. *Other Exciting Things Happening in the COVID-19 Space*

**John Hurdle** included a COVID-19 assignment for the students in his Clinical NLP class he taught online. It immersed his students into a real-world, data+noise intense space. Students processed a random selection of COVID-19 article abstracts culled from over 13,000 (and counting) maintained by Dimension/Data Science.

# EDUCATION

## The Education Mission

2020 was a challenging year for all, and our education initiatives were especially impacted by COVID. We are extremely thankful for our faculty and staff and how they managed the transition to online teaching during this crisis. In March when COVID hit, all DBMI courses were changed to an online format, after that and with more preparation, during the fall we moved all our courses to online instructions and that is the plan for the Spring of 2021.

## Updates from the Dept. Education Leadership

1. **Admissions Committee:** After more than 10 years serving as chair of the Admissions Committee, Guilherme Del Fiol stepped down from this position. We want to thank him for his leadership and dedication to a very important role in the department. John Hurdle has been asked to lead the PhD program and Damian Borbolla has been asked to lead the master program.
2. **Director of Graduate Students:** As Charlene Weir plans her retirement, Damian Borbolla stepped in as interim DoGS since September.

Thank you Charlene and Guilherme for all your years of service.

## Curriculum Committee Updates

Members of the committee are Damian (Chair), Ram, Kathy, Samir, and Karen.

During 2019 we received excellent feedback from our Industry Advisory Board (IAB) that guided the design and development of new courses in 2020 in our program. New Courses presented and approved during 2020 include:

**Damian Borbolla, MD, MS**
**Vice-Chair, Education**

- An advance course for our Data Science track students, Introduction to Deep Learning. Instructor Samir Abdelrahman, Semester offered: Spring, CH: 3
- Ram Gouripeddi redesigned the former Data Quality course supplementing new content on data wrangling for the students participating in the data science and bioinformatics track. Semester Offered: Spring. CH: 2

## DBMI BY THE NUMBERS

**Current MS Students**
65 (on campus)
14 (online)
1 (Asia Campus)

**Current PhD Students**
21 PhD
3 PostDoc

**2019 Graduates**
24 MS
8 PhD

**Alumni**
494

- Maia Hightower, UHealth CMIO and faculty in our department will be teaching the new course "Health Informatics for Health System Leaders" in partnership with the Master of Healthcare Administration (MHA) within the University School of Business. Semester offered: Spring. CH: 1.5
- Our long-standing Research Design course that Charlene Weir offered for many years, with 2 internal courses focused on the principles of research design and grant writing was transformed in 2 different classes. For the research design principle section, we are partnering with the Sociology department to offer a content-based course to introduce research design topics and John Hurdle will work with DBMI student to cover informatics specific research topics. (Thank you John Hurdle for leading this initiative) For the second session, we decided to partner with the MSCI program and include our students in the Grant Writing course. As part of this partnership Andrew Post, MD, PhD, CRIO at Huntsman, and faculty at DBMI agree to co-teach the class with Maureen Murtaugh PhD.

### Biomedical Informatics Health System Science and the New SOM Curriculum

Karen Eilbeck and Damian Borbolla together with other co-leaders from the SOM received a 30K grant from the American Medical Association (AMA) grant to increase the presence of Health System Science in the University of Utah School of Medicine (UUSOM) curriculum. And this past summer DBMI together with Dr. Sara Lamb, UUSOM Associate Dean of Curriculum, organized a retreat with the health system leadership focusing on five principles 1) Train students to be "systems thinkers", 2) Learning HSS should be a fun experience, 3) Students can, and should, learn from one another, 4) Students can help solve wicked problems the health system is facing, and 5 ) Allowing students to choose from HSS learning opportunities will improve engagement.

Also, as part of this initiative, Damian was accepted to the AMA HSS Fellowship program and will be working during 2021 with educator leaders from across the country to design new strategies to incorporate HSS into medical education.

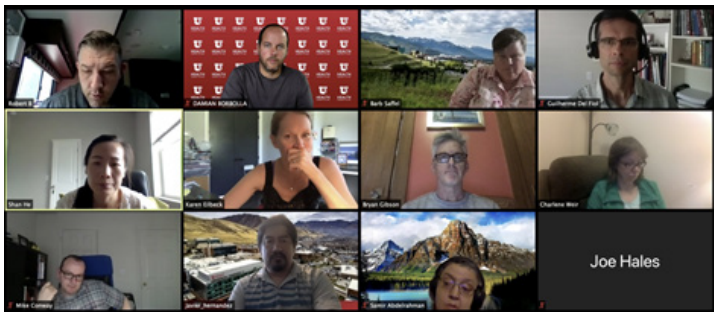
### Incorporating More Active Learning Opportunities

We keep offering internal practicum options: FHIR practicum, Data Science, and Global Health. During 2020, we increased the number of external practicum opportunities. Five new divisions at ARUP are offering practicum and internships to DBMI students. Activities offered this year include: the analysis of RNA sequencing data, reasons for antibiotic resistance in a bacterial cause of endocarditis, and building infrastructure in digital pathology.

Also, as part of an 1U4U initiative, Bruce Bray and Damian Borbolla, together with Jim Agutter from the College of Architecture and Planning, received a 15K University grant to incorporate Health Design Thinking principles to the DBMI FHIR practicum.

### Faculty Development Initiatives

In June, Charlene, Karen, and Damian offered the Education Summer Retreat focused on 3 areas: tracking the academic progress of our PhD students, behavioral and emotional




Issues, and mentoring norms. 19 DBMI faculty participated in the online meeting and we received very good feedback from participants. In a post-training survey we sent to faculty, all of

**Mentors**

- Create enduring personal relationships
- Create reciprocal relationships
- Model professional responsibility
- Provide proteges with direct career assistance
- Provide proteges with social and emotional support
- Serve as role models
- Help with identity transformation
- Offer a safe harbor for self-exploration
- Provide a roadmap to the discipline
- Help with graduate school

the responses rated the retreat with an 8 or over on a 10 point scale.

Because of COVID, many of our faculty had to transition to online instruction with little preparation. Nursing Informatics and DBMI (Catherine, Carolyn and Damian) put a workshop together in July, to help faculty and to share experiences related to online teaching. Canvas advance functionalities, synchronous sessions (Zoom) design and implementation issues, and engaging with online students were some of the topics covered in the workshop. This event was also very well received with over 30 faculty participating online. All training material is available online in a Canvas space to give faculty the opportunity to review it when needed.

### MS Students

We are excited with the quality and breadth of our Masters' students cohort again this year. We have 65 students enrolled in the program, 57 applicants applied last fall and 32 were accepted after a rigorous admission process. See graphic below with the progression in the last six years. 14 of the master students are participants of the new online program, launched in 2019. 24 students graduated during 2020 from the master program.

The students are actively engaged in guiding their own educational path. Phung Matthews, for example, was accepted in the Cambia Grove Innovator Fellowship, where together with a group of fellows, developed a FHIR application to standarize Social Determinants of Health.

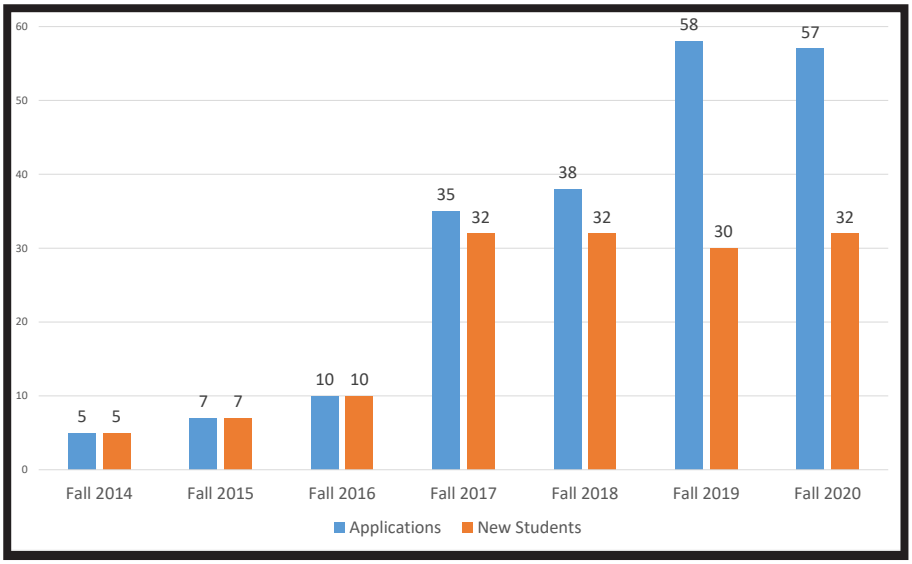
William (Rey) Johnson was also accepted in the MIT Catalyst Fellowship and during 2021 he will be working to identify and develop research projects with high potential for health care impact.

### PhD Students

21 PhD students and three postdoctoral trainees are participating in our program. This summer the NLM training grant conference was hosted virtually by OHSU and our students had a strong showing, Michael Watkins presented one of the aims of his research projects where he built a SMART on FHIR app and CDS hooks to improve the utility of pharmacogenomics test results.

David Sant, an NLM post doctoral trainee will be leaving us at the end of December to join the new NOORDA DO medical school in Provo as a research associate. David has worked with the Eilbeck Lab in collaboration with the UDoH to develop analysis pipelines for the Newborn Screening groups secondary genomic testing. A manuscript describing his work is accepted in Genetics in Medicine. Concurrently, he worked with the GREEKC initiative in the European Union building tools to better understand genetic regulations. This work entailed conference calls at strange hours, and due to the COVID epidemic, he missed out on international travel to the working group meeting. Rolando Hernandez has also finished his PhD and he plans to do a postdoctoral fellowship in Edinburgh, UK. We wish them the best of luck in this new stage of their careers.

## NTMS Admission Progression



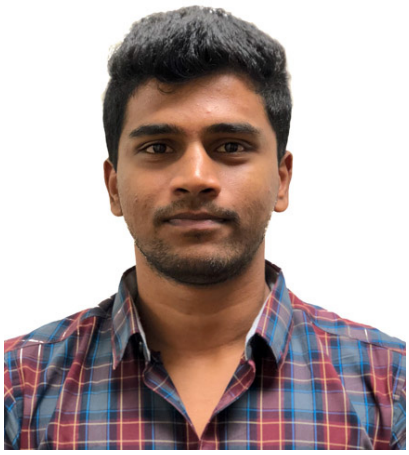
# A Goal in Mind - International Clinician Kicks off a Career in BMI

Yogesh Reddy, a recent graduate of our master program, just landed a prestigious position with one of the department's Industry Advisory Board members, Highmark Healthcare in Pittsburg, Pennsylvania. Highmark is a new-school blended health organization that relies heavily on data management practices like biomedical informatics. Because of Yogesh's successful entré into an industry position, the department highlighted his story in an article written by the University of Utah Marketing department. Written here is a brief introduction of this article.

When Yogesh Reddy was growing up in Mumbai, India, his idea of achieving success was becoming a professional soccer player. As he got older, Reddy's natural drive and athleticism served him well on the playing field and contributed to building his determination in sports and academics. Reddy was talented enough to play soccer at a college level. But, despite his love for the game, Reddy had a different goal in mind.

A sports-related injury led to a pause in Reddy's soccer career, and he realized he could still accomplish great things off the field. Reddy turned his full attention to earning his Bachelor of Medicine and Bachelor of Surgery (MBBS)—equivalent to a Doctor of Medicine (MD) in the United States—from Mahatma Gandhi Mission's Medical College in Aurangabad, Maharashtra, India. After Reddy completed his degree and required rotations, he began work as a researcher for the Public Health Foundation of India.

As a self-described empath, Reddy enjoyed the close human connection with patients, and cherished the shared joy that comes with creating better health. But he also knew there were ways he could improve his patients' experiences by learning more about health care systems and using data to change these systems for the better.



In India, electronic charting systems aren't widely implemented. During Reddy's medical practice, he noticed the large amount of time he, and other physicians, spent manually recording information, sifting through paper files, and performing other administrative tasks. When Reddy sought solutions, he discovered the field of biomedical informatics, and the first-of-its-kind master's program specific to that discipline at the University of Utah School of Medicine.

"When I came to Utah from India, it was important for me to get a holistic feel for American health care," Reddy says. "I knew the breadth of experiences and hands-on curriculum offered at the University of Utah would give me first-hand observation of the medical system and tools to address the issues I was seeing."

"The researchers here are pioneering the creation of clinical support tools," Reddy continues. "This is a great place to learn from the biggest names in the industry."

To view the entire article, please see https://medicine.utah.edu/dbmi/news/2020/10/reddy.php.

# INDUSTRY

## IABtalks

2020 was definitely an unusual year! We canceled the April event thinking that by October the world as we knew it would be back to normal. We were wrong! With no end in sight, we decided to host a virtual event. Incorporating the networking component was challenging but what was very successful was the engagement during the presentations that you wouldn't be able to match during an in-person event. Attendance from people that normally couldn't attend because they weren't local was also a big plus.

A highlight of the evening was the panel of students from BYU, UVU and the U of U discussing their student experiences in the various programs. University of Utah Health Plans sponsored this event and the Keynote Speaker was Maia Hightower, MD, MPH, MBA. She is the Chief Medical Information Officer for U of U Health. Her topic was "Capacity Building for Biomedical Informatics & Data Science in the New Decade".

## Growth of the IAB

The IAB continues to draw companies from Utah and nationally. We currently have 24 companies that partner with our department with several more in the pipeline. They are all enthusiastic supporters of the IAB's mission of building relationships between industry and academics to advance biomedical informatics. We commissioned a video this year that is a great overview of the IAB. See https://medicine.utah.edu/dbmi/industryopportunities/.

Chris Klomp, of Collective Medical Technologies says, "We feel grateful to be able to invest in BMI students as future leaders of our industry, to support the program as part of our local community, and to help provide opportunities to expose them to a variety of experiences and possibilities as they consider their post-graduation plans. It's a treat to interact with individuals who think so creatively and out of the box, who bring fresh perspectives and energy to extremely difficult challenges, and who push us to do better for the patients we serve."

# CLINICAL OPERATIONS

The Department continues to collaborate closely with clinical departments and clinical operations at the University of Utah to improve patient care and the provider experience. A centerpiece of this collaboration is the University's ReImagine EHR initiative, which is leading the nation in the design, development, implementation, and evaluation of interoperable digital innovations that are integrated with the EHR to improve care. Dr. Ken Kawamoto, Vice-Chair for Clinical Operations and Associate Chief Medical Information Officer for the health system, leads this initiative in close collaboration with a number of faculty, fellows, staff, and operational leaders across the institution, including Drs. Guilherme Del Fiol, Charlene Weir, Damian Borbolla, Bryan Gibson, Polina Kukhareva, Teresa Taft, Rick Bradshaw, Salvador Rodriguez, Doug Martin, and Tom Reese in the Department. The ReImagine EHR initiative has implemented over 10 standards-based, EHR-integrated solutions into University of Utah Health's clinical care environment, and many have been, or are in the process of, being integrated with other health systems and EHR platforms. Notable recognition and achievement in the clinical informatics realm over the past year include the following:

- Development of a free EHR-integrated COVID-19 Toolkit in collaboration with MDCalc, whose medical calculator tool is used by over 65% of U.S. physicians and millions of providers worldwide (https://apporchard.epic.com/Gallery/Index?id=5692)
- The Pediatric Patient Summary (PPS) app was presented as part of the Council on Clinical Information Technology (COCIT) program at the American Academy of Pediatrics national virtual conference this year. The title of the presentation was "Design and Development of an Electronic Health Record Add-on App to Support the Care of Children and Youth with Special Health Care Needs" and the authors were Damian Borbolla, Guilherme Del Fiol, Teresa Taft, Ryan Cornia, Phillip Warner, Andrew Iskander, Heidi Kramer, Charlene R. Weir, Kensaku Kawamoto, David E. Shields, and Chuck Norlin.
- Finalist recognition for the ReImagine EHR lung cancer screening shared decision making app in the AMIA/HL7 FHIR® Applications Showcase at the AMIA 2020 Annual Meeting, presented by Dr. Salvador Rodriguez.
- Continued success in securing grants

**Kensaku Kawamoto, MD, PhD, MHS**
**Vice-Chair, Clinical Operations**

enabled by the ReImagine EHR initiative, including a number of the grants listed in the Research section of the newsletter.

A number of high-impact publications, including the following. Members of the Department are bold-faced below:

- **Reese TJ, Del Fiol G**, Tonna JE, **Kawamoto K**, Segall N, **Weir C**, Macpherson BC, **Kukhareva PV**, Wright MC. Impact of integrated graphical display on expert and novice diagnostic performance in critical care. *J Am Med Inform Assoc*. 2020;27(8):1287-1292. doi:10.1093/jamia/ocaa086
- **Del Fiol G**, Kohlmann W, **Bradshaw RL**, **Weir CR**, Flynn M, Hess R, Schiffman JD, **Nanjo C, Kawamoto K**. Standards-based clinical decision support platform to manage patients who meet guideline-based criteria for genetic evaluation of familial cancer. *JCO Clin Cancer Inform*. 2020 Jan;4:1-9.
- **Reese TJ**, Segall N, **Del Fiol G**, Tonna JE, **Kawamoto K, Weir C**, Wright MC. Iterative heuristic design of temporal graphic displays with clinical domain experts. *J Clin Monit Comput*. 2020 Aug 2.
- **Weir CR, Taber P, Taft T, Reese TJ**, Jones B, **Del Fiol G**. Feeling and thinking: can theories of human motivation explain how EHR design impacts clinician burnout? *J Am Med Inform Assoc*. 2020 Nov 12:ocaa270.
- Curran RL, **Kukhareva PV, Taft T, Weir CR, Reese TJ, Nanjo C, Rodriguez-Loya S**, **Martin DK**, Warner PB, Shields DE, Flynn MC, Boltax JP, **Kawamoto K**. Integrated displays to improve chronic disease management in ambulatory care: A SMART on FHIR application informed by mixed-methods user testing. *J Am Med Inform Assoc*. 2020 Aug 1;27(8):1225-1234.
- Humphreys BL, **Del Fiol G**, Xu H. The UMLS knowledge sources at 30: indispensable to current research and applications in biomedical informatics. *J Am Med Inform Assoc*. 2020 Oct 1;27(10):1499-1501.
- Karhade AV, Schwab JH, **Del Fiol G, Kawamoto K**. SMART on FHIR in spine: integrating clinical prediction models into electronic health records for precision medicine at the point of care. *Spine J*. 2020 Jun 26:S1529-9430(20)30820-2.
- Haynes RB, **Del Fiol G**, Michelson M, Iorio A. Context and approach in reporting evaluations of electronic health record-based implementation projects. *Ann Intern Med*. 2020 Jun 2;172(11 Suppl):S73-S78.
- **Kawamoto K**, McDonald CJ. Designing, conducting, and reporting clinical decision support studies: recommendations and call to action. *Ann Intern Med*. 2020 Jun 2;172(11 Suppl):S101-S109.
- Richesson RL, **Staes CJ**, Douthit BJ, Thoureen T, Hatch DJ, **Kawamoto K, Del Fiol G**. Measuring implementation feasibility of clinical decision support alerts for clinical practice recommendations. *J Am Med Inform Assoc*. 2020 Apr 1;27(4):514-521.
- Ciarkowski CE, Timbrook TT, **Kukhareva PV**, Edholm KM, Hatton ND, Hopkins CL, Thomas F, Sanford MN, Igumnova E, Benefield RJ, **Kawamoto K**, Spivak ES. A pathway for community-acquired pneumonia with rapid conversion to oral therapy improves healthcare value. *Open Forum Infect Dis*. October 2020. doi:10.1093/ofid/ofaa497
- Bradley S, Harwell C, **Kukhareva PV**, Yarbrough P, Hall SK. Osteoporosis care following incidental vertebral fractures: a retrospective cohort study. *J Gen Intern Med*. June 2020. doi:10.1007/s11606-020-05858-3
- Horton DJ, Graves KK, **Kukhareva PV**, Johnson SA, Cedillo M, Sanford M, Dunson WA, White M, Roach D, Arego JJ, **Kawamoto K**. Modified early warning score-based clinical decision support: cost impact and clinical outcomes in sepsis. *JAMIA Open*. 2020. doi:10.1093/jamiaopen/ooaa014

**Clinical Operations,** continued

- Edholm K, Lappé K, **Kukhareva PV**, Hopkins C, Hatton ND, Gebhart B, Nyman H, SIgnor E, Davis M, **Kawamoto K**, Johnson SA. Reducing diabetic ketoacidosis intensive care unit admissions through an electronic health record-driven, standardized care pathway. *J Health Qual*. January 2020:1.oi:10.1097/jhq.0000000000000247
- Fernandez ME, Schlechter CR, **Del Fiol G, Gibson B, Kawamoto K**, Siaperas T, Pruhs A, Greene T, Nahum-Shani I, Schulthies S, Nelson M, Bohner C, **Kramer H, Borbolla D**, Austin S, **Weir C**, Walker TW, Lam CY, Wetter DW. QuitSMART Utah: an implementation study protocol for a cluster-randomized, multi-level Sequential Multiple Assignment Randomized Trial to increase Reach and Impact of tobacco cessation treatment in Community Health Centers. *Implementation Science*. 2020;15(1):9.
- **Butler JM, Gibson B**, Lewis L, Reiber G, **Kramer H**, Rupper R, Herout J, Long B, Massaro D, **Nebeker J**. Patient-centered care and the electronic health record: exploring functionality and gaps. *JAMIA Open*, Volume 3, Issue 3, October 2020, 360–368.
- **Gibson B, Kramer H, Weir C, Del Fiol G**, et al. Workflow analysis for design of an electronic health record based tobacco cessation intervention in community health centers *JAMIA Open*. *In press*.
- Schnock K, **Butler J, Gibson B**, et al. Engaging patients in the use of real-time electronic clinical data to improve the safety and reliability of their own care. *Journal of Patient Safety*. *In press*.
- **Butler J, Gibson B**, et al. Patient perceptions of hospital experiences: implications for innovations in patient safety centers *Journal of Patient Safety*. *In press*.
- **Reese TJ**, Schlechter C, Potter L, **Kawamoto K, Del Fiol G**, Lam C, Caverly T, Wetter D. Evaluation of revised USPSTF lung cancer screening guideline among minority and vulnerable populations. *JAMA Network Open*. *In press*.
- Yan L, **Reese TJ**, Nelson S. Computerized clinical decision support systems for clinical pharmacy in the Meaningful Use era: a systematic review. *Applied Clinical Informatics*. *In press*.

# We Bid a Fond Farewell to Bernie LaSalle

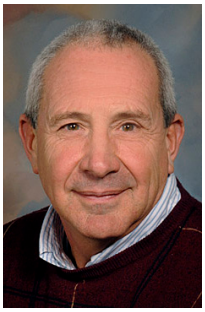
Bernie LaSalle, a beloved faculty member and instructor in our department retired at the end of April in 2020. However, he will continue to facilitate case-based learning sessions with medical students. Because of retrictions on meeting in person, we held a virtual farewell party where he was honored for his contributions to the department and to our students.

Bernie has an excellent record of research, publication, grant funding, teaching and mentoring in our department since 2010 and within the University since 2001. We are happy that he has agreed to stay on in a part-time capacity.

# FACULTY AWARDS AND HONORS

**DAMIAN BORBOLLA, MD, MS**

Dr. Borbolla was accepted into the 2020-2021 AMA's new Health Systems Science Scholars Program. This is a new effort of the AMA to provide select medical school and residency program faculty with the resources and coaching they need to design, implement and evaluate Health Systems Science curricula at their institutions. Dr. Borbolla was also elected as co-chair for the AMIA Community of Professional Master's Educators (PMEC) for the next two years. In addition, Dr. Borbolla was accepted to the Academic Medicine Writing Fellowship that will introduce him to opportunities to publish in medical education journals and work in a team to submit a scholarly project to MedEdPORTAL.



**JULIO FACELLI, PHD**

Dr. Facelli accepted an invitation to join the Editorial Board of *The Journal of Clinical and Translational Science* (JCTS). JCTS is the official journal of the Association of Clinical and Translational Science. The mission of JCTS is to provide a forum for disseminating advances in clinical and translational science with articles that include investigations into how to best develop processes and people that translate discoveries into improved health.

**Karen Eilbeck, PhD and Damian Borbolla, MD, MS**

Drs. Eilbeck and Borbolla were spotlighted in the Core Educator Newsletter this past Spring. They are domain experts for biomedical informatics and Dr. Eilbeck is a co-director of Host and Defense. Dr. Eilbeck comments, "Once a week I entered the world of first year medical students and everything changed. We are part of a national community of informatics educators and thus draw on diverse perspectives to solve problems."

**Scott Narus, PhD, MS**

Dr. Narus was selected as the inaugural Chair of the new Center for Standards-based Healthcare Interoperability. The mission of the Center is to enhance the quality of care and other health-related services they provide to their community by optimizing the ability of their information systems to integrate and share data. It goes beyond just data and includes interoperability of applications, knowledge, and other content.

**Charlene Weir, PHD, RN**

Dr. Weir has been recognized by ACMI as one of six Distinguished Fellows. It was announced at the ceremonies during this past year's AMIA Symposium.

# STUDENT SCHOLARSHIPS, AWARDS & HONORS

## RICHARD A. FAY & CAROL M. FAY FELLOWSHIP

The Richard A. Fay and Carol M. Fay Endowed Graduate Fellowship was established by Mr. and Mrs. Richard A. Fay in memory of Homer Warner, MD, PhD. The expendable funds are to be administered by the department chair, and are designated to support graduate students' training, and this year, we were able to provide three fellowships. The recipients are:

Ryzen Benson

Sejal Mistry

John Chamberlin

## BRUCE A. HOUTCHENS, MD RESEARCH FUND

The Bruce A. Houtchens, MD Research Fund was established by Maria K. Houtchens, Dr. Houtchens' widow to support exceptionally worthy research in the Department and to encourage excellence and outstanding achievement by students. The recipients are:

Amber Kiser

Rolando Hernandez

Michael Watkins

Janette Vazquez

## ROLLAND H. REITER SCHOLARSHIP

The Rolland H. Reiter Scholarship is awarded to a master's student chosen based on their interest and contributions to the clinical application of biomedical informatics with an emphasis on enhancing quality and/or reducing waste in medicine. Applicants must be working full-time in health informatics at a hospital, a health care system, or a private software or service company related to health care informatics. The award goes towards their tuition up to $6,000. This year's recipient is Shea O'Brien.

Shea O'Brien

## JOHN D. MORGAN AWARD

The John D. Morgan Award is a $5,000 cash award presented each year to an outstanding PhD student in the Department of Biomedical Informatics. The Awards Committee makes their decision based on their NIH Bio Sketch, their student transcripts, a letter of recommendation by the applicants' supervisory committee's chair and a copy of the student's best submitted manuscript. In addition, any service activities related to the Department or the larger informatics community are considered. Congratulations to Michael Watkins (2019 recipient) and Siru Liu (2020 recipient). Due to circumstances surrounding the pandemic, both recipients will be presenting their papers on Feburary 4, 2021 at 12:00noon.

**Michael Watkins**

FHIR Lab Reports: using SMART on FHIR and CDS Hooks to increase the clinical utility of pharmacogenomic laboratory test results
Michael Watkins, Karen Eilbeck, PhD

**Siru Liu**

A Theory-based Meta-regression of Factors Influencing Clinical Decision Support Adoption
Siru Liu, Thomas J. Reese, Kensaku Kawamoto, Guilherme Del Fiol, Charlene Weir

## DR. HELMUTH F. ORTHNER ENDOWED FELLOWSHIP

The Helmuth F. Orthner Endowed Fellowship was established in memory of Helmuth F. Orthner, PhD, FACMI. The purpose of the fellowship is to provide financial assistance through scholarships to deserving graduate students and post-doctoral fellows who demonstrate academic excellence and financial need. Congratulation to this year's recipient (and first recipient), Ram Siripuram. His research interests are centered on predictive analytics using machine learning and deep learning in biomedical research, with an emphasis on clinical applicaitons.

**Ram Siripuram**

## FOUNDERS' FUND ENDOWMENT

This endowment supports one-year projects up to $2,000 by Department of Biomedical Informatics graduate students and postdoctoral fellows in new, innovative areas related to their research. Congratulations to this year's recipient, Siru Liu.

**Siru Liu**

Funded Research: Using the Unified Theory of Acceptance and Use of Technology Plus (UTAUT+) for Characterizing and Optimizing Clinical Decision Support (CDS)

# SYMPOSIUM PRESENTATIONS

Our Department's students, alumni, and faculty had a very strong showing in almost all presentation categories.

**Nursing Informatics Working Group Special Event: "2020 The Year of the Nurse: Past, Present, and Future of Nursing Informatics"**
S. Newbold, V. Tiase, New Your-Presbyterian Hospital, J. Carrington, University of Florida, M. Wilson, University of Alabama at Birmingham, Mollie Cummins, University of Utah, J. Brixey, UT SBMI/SON, E. Borycki, University of Victoria

**Panel: Actionable Opportunities for Improving Opioid Prescribing through Use of Informatics**
Neel Shimpi, T. Reese, University of Utah; R. Nagarajan, Marshfield Clinic Research Institute; C. Harle, University of Florida; K. Williams, City University of New York; A. Alekseyenko, Medical University of South Carolina; Y. Waller, DentaLens

**Oral Presentation: Utilization of BPM+ Health for the Representation of Clinical Knowledge: A Framework for the Expression and Assessment of Clinical Practice Guidelines (CPG) Utilizing Existing and Emerging Object Management Group (OMG) Standards**
R. Lario, University of Utah, Veterans Admin.; S. Hasely, University of Pittsburgh Medical Center; S. White, Stevens Institute of Technology; K. Eilbeck, K. Kawamoto, University of Utah; R. Soley, Object Management Group (OMG); S. Huff, University of Utah, Intermountain Health

**Oral Presentation: Model Applications Across the Spectrum of Care: "Can the UTAUT Model Characterize Clinical Decision Support?"**
Siru Liu, University of Utah

**Poster: A Corpus Analysis of Social Isolation from Clinical Notes of Patients with Cancer**
J. Guo, C. Radloff, K. Sward, S. Beck, University of Utah; W. Chapman, University of Melbourne; G. Donaldson, University of Utah; L. Frey, Medical University of South Carolina

**Poster: Characterizing Electrocardiograms of Severe Hypoglycemia Using K-Means based Clustering**
S. Mistry, S. Abdelrahman, C. Reno, D. Groat, R. Gouripeddi, S. Fisher, J. Facelli, University of Utah

**Poster: Standardizing Nursing Orders to Better Assess Acuity and Improve Nursing Workflow**
S. Yusuf, M. Hambly, C. Staes, University of Utah

**Academic Forum: Educational Research Showcases - "The Impact of the Industry Advisory Board on Education Endeavors"** Karen Eilbeck, University of Utah

**System Demonstrations – Genetic Data Processing and Support: "FHIR and CDS Hooks-Based Population Health Management Coupled with Patient Outreach via Chatbot Technology: a Use Case in Genetic Counseling for Familial Cancer Risk"**
R. Bradshaw, K. Kawamoto, G. Del Fiol, University of Utah

**System Demonstrations – Genetic Data Processing and Support: "Genomic Sequencing: Tracking, Ordering and Collaboration with GNomEx"**
A. Maness, E. Rasmussen, A. Cho, J. Hofer, J. Luther, M. Reynolds, S. Hewitt, D. Nix, A. Post, Huntsman Cancer Institute

**Poster: A Harmonized Framework to Evaluate Impacts of ECHO Pain and Opioid Training on Patients and Clinicians**
L. Tran, R. Gouripeddi, J. Facelli, University of Utah

**Oral Presentation - Documentation of Social Determinants of Health in Healthcare Organizations in Perú: A field study to inform the development of a FHIR app**
J. Silva Valencia, S. Escobar, Universidad Nacional Mayor de San Marcos; B. Viernes, M. Watkins, University of Utah; L. Rojas-Mezarina, National Institutes of Health, Universidad Nacional Mayor de San Marcos; V. Nguyen, Stratametrics LLC; H. Espinoza-Herrera, Universidad Nacional Mayor de San Marcos; D. Borbolla, University of Utah

## Symposium Presentations, continued

**Panel: Education on FHIR: Multi-disciplinary Perspectives to Incorporate FHIR in Health Informatics Training Initiatives**
D. Borbolla, C. Staes, L Heermann Langford, V. Nguyen, University of Utah

**Panel: Building on Success: Standards-based Decision Support in Commercial EHRs**
K. Kawamoto, University of Utah; B. Rhodes, Dynamic Content Group; E. McPeek Hinz, Duke University Health System; J. Malinowski, Cerner; D. Hurwitz, Allscripts

**Poster: Linking Polyps to Jars: Information Loss Across Colonoscopy and Pathology Reports**
O. Patterson, VA Salt Lake City Health Care System

**Oral Presentation: Developing and Validating a Model for Detecting Tension in the Electronic Problem List**
C. Hodge, S. Narus, Intermountain Healthcare, University of Utah; G. Stoddard, University of Utah

**Oral Presentation: The Anatomy of Clinical Documentation: An Assessment and Classification of Narrative Note Sections Format and Content**
T. Colicchio, University of Alabama at Birmingham

**Oral Presentation: A Preliminary Characterization of Canonicalized and Non-Canonicalized Section Headers Across Variable Clinical Note Types**
Danielle Mowery, University of Pennsylvania

**Panel: De-Identification of Clinical Text: Stakeholders' Perspectives and Acceptance of Automatic De-Identification**
S. Meystre, Medical University of South Carolina; J. Silverstein, University of Pittsburgh School of Medicine; G. Savova, Boston Children's Hospital; V. Petkov, National Cancer Institute; B. Malin, Vanderbilt University Medical Center

**Panel - Training Women for Leadership in Informatics and Digital Health: A Report from the Inaugural Women in AMIA Leadership Program**
W. Chapman, University of Melbourne; A. Grando, Arizona State University; M. Johns, The Monarch Center; G. Savova, Harvard University; M. Hightower, University of Utah Health

**Panel - Translational Research of Machine Learning and Artificial Intelligence Advances in Clinical Settings - Experiences and Challenges**
W. Hersh, Oregon Health & Science University; G. Jackson, IBM Watson Health; M. Williams, Geisinger; C. Walsh, Vanderbilt University; D. Dorr, Oregon Health & Science University

**Panel - Informatics Challenges of COVID-19 Crisis: A Comprehensive Response from One Health System**
A. Alekseyenko, D. Ford, S. McSwain, L. Lenert, B. Welch, Medical University of South Carolina

**NLP Working Group Pre-Symposium: Doctoral Consortium, Highlights, and Real-life Applications - COVID-19 Information Extraction Rapid Deployment Using NLP and Machine Learning**
Stephane Meystre, Medical University of South Carolina

**Clinical Decision Support: Metrics, Efficacy, and Alert Burden Reduction**
R. Schreiber, A. Wright, A. McCoy, D. Sittig, M. Grasso

**Practicing Deep Learning in Clinical NLP**
H. Xu, H. Eyre, O. Patterson

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# SYMPOSIUM AWARDS

## HL7 FHIR Applications Showcase Finalist:
Salvador Rodriguez

Lung Cancer Screening Shared Decision Making App
Salvador Rodriquez, Kensaku Kawamoto